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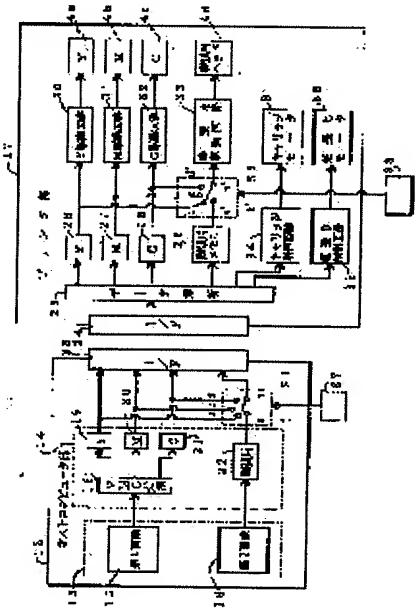
(54) METHOD FOR FORMING STEREOSCOPIC IMAGE USING INK JET PRINTER

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a technology for forming a stereoscopic image having protrusions and recesses easily and simply by using an ink jet printer.
SOLUTION: The ink jet printer has a host computer section comprising an imaging application and a printer driver, and a printer section comprising a print head. The printer driver or the printer section is provided with means for making a selection between normal ink print and expansion ink print. One of two kinds of image data generated from the imaging application is printed on a sheet using a normal ink print and the other is printed, at once, on a sheet using an expansion ink print head. Alternatively, normal ink print operation and expansion ink print operation are carried out in twice by exchanging the print head or expansion ink print operation is carried out using one color data in the image of normal print selected by the selection means.



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CLAIMS

[Claim(s)]
[Claim 1] (a) The host computer section possessing the printer driver which creates printing data in response to the data created with the application and this application for image creation, (b) It has the printer section possessing the print head driven by the driving pulse from the drive circuit to which the data stored in the memory area which the data from said printer drive are inputted and is stored by one raster, and this memory area are read and supplied, and this drive circuit. Usually, a selection means to choose expansion ink printing in ink usually according to printing and transparence expansion ink is formed in said printer driver. Printing one side of the data of the image of two kinds of different A and B created with said application to a printing hand-ed by the usual ink print head which carries out the regurgitation of the usual ink in said print head The creation approach of the solid image by the ink jet printer which prints another side of the data of said image to the same printing hand-ed by the expansion ink print head which carries out the regurgitation of the transparence expansion ink.
[Claim 2] The creation approach of the solid image by said ink jet printer according to claim 1 which usually prints another side of the data of said image to said printing hand-ed by the ink print head after printing one side of the data of the image of two kinds of different A and B created with said application to a printing hand-ed by the expansion ink print head which carries out the regurgitation of the expansion ink in said print head.
[Claim 3] The creation approach of the solid image by said ink jet printer according to claim 1 which prints transparent expansion ink to said printing hand-ed by the expansion ink print head which carries out the regurgitation after [which carries out the regurgitation of the usual ink in said print head for one side of the data of the image of two kinds of different A and B created with said application] usually printing to a printing hand-ed by the ink print head.
[Claim 4] After printing one side of the data of the image of two kinds of different A and B created with said application to a printing hand-ed by the expansion ink print head which carries out the regurgitation of the expansion ink in said print head, While exchanging ink for the usual ink print head which carries out the regurgitation, this expansion ink print head usually The creation approach of the solid image by said ink jet printer according to claim 1 which returns this printing hand-ed to a original location again, and usually prints another side of the data of said image to said printing hand-ed by the ink print head.
[Claim 5] (a) The host computer section possessing the printer driver which creates printing data in response to the data created with the application and this application for image creation, (b) It has the printer section possessing the print head driven by the driving pulse from the drive circuit to which the data stored in the memory area which the data from said printer drive are inputted and is stored by one raster, and this memory area are read and supplied, and this drive circuit. The creation approach of the solid image by the ink jet printer which specifies one color of the image data created with said application in said printer driver, ****s in the specified color, and prints expansion ink to a printing hand-ed.
[Claim 6] The creation approach of the solid image by said ink jet printer according to claim 5 which returns this printing hand-ed to a original location again, and usually prints another side of the data of said image to said printing hand-ed by the ink print head while usually exchanging for

an ink print head which usually carries out the regurgitation of the ink for this expansion ink print head after printing said expansion ink to a printing hand-ed by the expansion ink print head which carries out the regurgitation.

[Claim 7] (a) The host computer section possessing the printer driver which creates printing data in response to the data created with the application and this application for image creation, (b) It has the printer section possessing the print head driven by the driving pulse from the drive circuit to which the data stored in the memory area which the data from said printer drive are inputted and is stored by one raster, and this memory area are read and supplied, and this drive circuit. The creation approach of the solid image by the ink jet printer which specifies one color of the image data of said printer section in said printer section, ****s in the specified color, and prints expansion ink to a printing hand-ed.

[Claim 8]

* NOTICES *

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the creation approach of the solid image by the ink jet printer which prints from a nozzle by breathing out ink to printing hands-ed, such as paper, (printing). Furthermore, when it explains in full detail, it is related with the creation approach of the solid image by the ink jet printer which creates irregular three-dimensional printed matter by printing in expansion ink to a print sheet.
[0002]
[Description of the Prior Art] If three-dimensional printing which has irregularity in advertisement advertising paper or a poster is generally performed, it is well conspicuous from other advertising objects, and effective. Therefore, for example, the technique about the creation approach of the solid record image which applies on a form the thermal-expansion layer which uses a thermal-expansion nature minute ball as a principal component is indicated by JP,56-144998,A.
[0003] However, in such a Prior art, there is a problem that what to apply to usual ink jet printer equipment how and its concrete method is unknown, application is difficult or there is an inconvenient point.
[0004]
[Problem(s) to be Solved by the Invention] This invention is offering the technique which adds amelioration to existing ink jet printer equipment for a while, and only uses expansion ink, and printing of a solid image can create easily and easily on space.
[0005]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the creation approach of the solid image by the ink jet printer according to claim 1 (a) The host computer section possessing the printer driver which creates printing data in response to the data created with the application for image creation, and its application, (b) It has the printer section possessing the print head driven by the driving pulse from the drive circuit to which the data stored in the memory area which the data from a printer drive are inputted and is stored by one raster, and its memory area are read and supplied, and this drive circuit. Usually, a selection means to choose expansion ink printing in ink usually according to printing and transparence expansion ink is formed in said printer driver. Printing one side of the data of the image of two kinds of different A and B created with said application to a printing hand-ed by the usual ink print head which carries out the regurgitation of the usual ink in said print head Another side of the data of said image is printed to the same printing hand-ed by the expansion ink print head which carries out the regurgitation of the transparence expansion ink.
[0006] Moreover, in claim 1, the creation approach of the solid image by the ink jet printer according to claim 2 usually prints another side of the data of said image to said printing hand-ed by the ink print head, after printing one side of the data of the image of two kinds of different A and B created with said application to a printing hand-ed by the expansion ink print head which carries out the regurgitation of the expansion ink in said print head.
[0007] Furthermore, in claim 1, the creation approach of the solid image by the ink jet printer

according to claim 3 is printed to said printing hand-ed by the expansion ink print head which carries out the regurgitation of the transparent expansion ink, after [which carries out the regurgitation of the usual ink in said print head for one side of the data of the image of two kinds of different A and B created with said application] usually printing to a printing hand-ed by the ink print head.

[0008] Furthermore, the creation approach of the solid image by the ink jet printer according to claim 4 again After printing one side of the data of the image of two kinds of different A and B created with said application to a printing hand-ed in claim 1 by the expansion ink print head which carries out the regurgitation of the expansion ink in said print head, While exchanging ink for the usual ink print head which usually carries out the regurgitation of the expansion ink print head, a printing hand-ed is again returned to a original location, and another side of the data of said image is usually printed to a printing hand-ed by the ink print head.

[0009] Moreover, the creation approach of the solid image by the ink jet printer according to claim 5 (a) The host computer section possessing the printer driver which creates printing data in response to the data created with the application for image creation, and its application, (b) It has the printer section possessing the print head driven by the driving pulse from the drive circuit to which the data stored in the memory area which the data from said printer drive are inputted and is stored by one raster, and its memory area are read and supplied, and this drive circuit. One color of the image data created with said application is specified in said printer driver, it ****s in the specified color, and expansion ink is printed to a printing hand-ed.

[0010] Furthermore, in claim 5, after printing to a printing hand-ed by the expansion ink print head which carries out the regurgitation of said expansion ink, while the creation approach of the solid image by the ink jet printer according to claim 6 exchanges ink for the usual ink print head which usually carries out the regurgitation of the expansion ink print head, it returns a printing hand-ed to a original location again, and usually prints another side of the data of said image to said printing hand-ed by the ink print head.

[0011] Furthermore, the creation approach of the solid image by the ink jet printer according to claim 7 again (a) The host computer section possessing the printer driver which creates printing data in response to the data created with the application for image creation, and its application, (b) by the driving pulse from the drive circuit to which the data stored in the memory area which the data from said printer drive are inputted and is stored by one raster, and its memory area are read and supplied, and its drive circuit It has the printer section possessing the print head to drive, one color of the image data of said printer section is specified in said printer section, it ****s in the specified color, and expansion ink is printed to a printing hand-ed.

[0012] Moreover, in claim 7, after printing to a printing hand-ed by the expansion ink print head which carries out the regurgitation of said expansion ink, while the creation approach of the solid image by the ink jet printer according to claim 8 exchanges ink for the usual ink print head which usually carries out the regurgitation of the expansion ink print head, it returns a printing hand-ed to a original location again, and usually prints another side of the data of said image to said printing hand-ed by the ink print head.

[0013]

[Embodiment of the Invention] Next, the gestalt of the example of this invention is explained, referring to a drawing. Since the direction of the solid screen which has irregularity in a screen in a poster or the drawing of advertising advertisement is generally well conspicuous, it is better. For example, after [which has a color on a form 1 as shown in drawing 1 (a)] usually painting by ink 2 and 2' (printing), as shown in drawing 1 (b), it paints by the transparent expansion ink 3 of a colorless or light color, and 3' (printing). Moreover, as shown in drawing 2 (a), after painting in expansion ink 3 on a form 1, as shown in drawing 2 (b), it usually paints by ink 2 and 2'. Since a screen will become a solid target's image if it does in this way, strange sensibility is given to those who see and it is effective. In addition, when the cellular material into which has ingredients various as ink for expansion, for example, it was put into ink material comes out of an ink container, it foams rapidly and there are some which swell ink material.

[0014] Drawing 3 is the perspective view showing 1 operation gestalt of the print head used for the creation approach of the solid image by the ink jet printer of this invention. That is, the print

head 4 is equipped with head for yellow 4a which takes out yellow ink, head for Magentas 4b which takes out Magenta ink, head for cyanogen 4c which takes out cyanogen ink, and head 4d for expansion which takes out expansion ink. The nozzle is prepared in the printing side at these heads 4a, 4b, 4c, and 4d, respectively, an ink room is prepared for every nozzles of those, the piezoelectric device is prepared in each ink room, if an electrical potential difference is impressed to this piezoelectric device, the volume of an ink room will change and the ink of the ink interior of a room will blow off from a nozzle to a print sheet.

[0015] Carriage 5 is equipped with the print head 4. The guide shaft 7 established crosswise [of a print sheet 6] is inserted in carriage 5. Moreover, the belt 8 is being fixed to carriage 5 and the suspension of this belt 8 is carried out to the pulley 10 of a motor 9. A belt 8 carries out both-way migration crosswise [of a print sheet] in accordance with the guide shaft 7 by rotation of a motor 9. In accordance with the guide shaft 7, the timing slit 11 on which the slit (graduation) was engraved is formed under the carriage 5. Moreover, a print sheet is moved to the longitudinal direction of a form by the paper feed motor (not shown).

[0016] Drawing 4 is the block circuit diagram showing 1 operation gestalt of the ink jet printer equipment used for the creation approach of the solid image by the ink jet printer of this invention. The host computer section 12 consists of application 13 for image creation, and a printer driver 14. As for the application 13 for image creation, the 1st image 15 describing the goods graphic form of an advertising object and the 2nd image 16 in which the expansion graphic form of the expansion condition of the goods is shown are formed. From the application 13 for image creation containing the 1st image 15 and the 2nd image 16, data are supplied to a printer driver 14. In response to this data, printing data are created by the printer driver 14, and the printer section 17 drives. The data decomposition processing section 18 which disassembles the data received from the application 13 for image creation according to a color is formed in the printer driver 14, and this data decomposition processing section 18 disassembles the received data according to yellow (Y), a Magenta (M), and the color of cyanogen (C), and develops them to bit map data. Among this bit map data, Magenta data are stored in the memory area 19 for yellow, and the Magenta field 20 and cyanogen data are stored in the memory area 21 for cyanogen for yellow data, respectively. Moreover, the data of the expansion graphic form from the 2nd image 16 are stored in the memory area 22 for expansion. A printer driver 14 reads data from memory areas 19, 20, 21, and 22 in a line (namely, swath, period when below-mentioned carriage moves and goes to one direction) unit, namely, they carry out a raster scan, and it is transmitted to the printer section 17 through the interface 23 in a host computer, and the interface 24 in the printer section 17. And it separates into the data according to color in the data analysis section 25 of the printer section 17. And Magenta data are stored in the memory area 26 for yellow, and the Magenta field 27 and cyanogen data are stored in the memory area 28 for cyanogen for yellow data by one raster, respectively. Moreover, the image data for expansion is stored in the memory area 29 for expansion.

[0017] After storing of the data for one raster finishes with each [these] memory area, each data is read from each memory area, each drive circuit 30, 31, 32, and 33 is supplied, and it is changed into a driving pulse here. Each print heads 4a, 4b, and 4c drive by these driving pulses, color ink is breathed out from the nozzle of each head, and 4d of print heads drives by the driving pulse, expansion ink is breathed out from the nozzle which is head 4d, and printing for one raster is performed. The carriage 5 of a head moves by rotation of the carriage motor 9 controlled by the output-control signal of the carriage control circuit 34 in that case. Moreover, after printing for one raster finishes, only the part to which a print sheet ****s in one raster moves. Paper feed moves by rotation of the paper feed motor 36 controlled by the output-control signal of the vertical-format-unit circuit 35 in that case. In addition, in this example, the ink usual with one scan of a reason and a head and the both sides of expansion ink which are equipped with the usual ink heads 4a, 4b, and 4c and ink head 4d for expansion on the carriage 5 of a piece are applied (printing). In addition, what is necessary is just to scan twice, in being two heads to which the heads 4a, 4b, and 4c for ink and head 4d for expansion are usually separate.

[0018] Now, above-mentioned actuation is actuation when the connection terminal t of a change-over switch S1 is connected by the manual operation button 37 like m-a and connection

terminal t' of a change-over switch S2 is connected by the manual operation button 38 like m'-a'. Next, the connection terminal t of a change-over switch S1 is connected by now 37, for example, a manual operation button, like m-b, and connection terminal t' of a change-over switch S2 explains actuation of a case [connecting like m'-a']. In this case, since the yellow color of the image data created with the application 13 for image reconstructions is specified in a printer driver 14, it ****s in that specified yellow color, data are read from the memory area 19 for yellow data and it is taken out via terminal b-m, it ****s in a yellow color and expansion ink is printed by the print sheet (printing hand-ed).

[0019] Moreover, it connects like m-a and, on the other hand, the connection terminal t of a change-over switch S1 explains actuation when connection terminal t' of a change-over switch S2 is connected like m'-b', for example. In this case, in the printer section 17, since the yellow color is specified, it ****s in that specified yellow color, and data are read from the memory area 26 for yellow data, it is taken out via terminal b-m, it ****s in a yellow color, and expansion ink is printed by the print sheet (printing hand-ed).

[0020] Next, in the case of one head with which only the usual ink heads 4a, 4b, and 4c are carried on the carriage 5 of a piece, printing actuation of ink is usually controlled by the host computer section 12 and the printer section 17, and ink is usually first printed to the 1st time. Next, it directs to an actuation user, "To feed paper to the form which exchanged print heads for expansion ink and was printed to the 1st time again." And the print head of the printer section 17 is changed into expansion ink, and after checking that paper has been again fed to the form usually printed by the 1st time in ink, printing actuation of expansion ink is controlled by the host computer section 12 and the printer section 17 to print in expansion ink. Moreover, in the case of one head with which only the usual ink heads 4a, 4b, and 4c are carried on the carriage 5 of a piece, printing actuation of expansion ink is conversely controlled by the host computer section 12 and the printer section 17, and expansion ink is first printed to the 1st time. Next, it directs to an actuation user, "To feed paper to the form which usually exchanged print heads for ink and was printed to the 1st time again." And the print head of the printer section 17 is changed into expansion ink, and after checking that paper has been again fed to the form printed by the 1st time in expansion ink, printing actuation of expansion ink is controlled by the host computer section 12 and the printer section 17 to print in expansion ink. Thus, in this invention, the head of two or more ** which have one piece if needed is used. After usually printing in ink to one printing actuation or the 1st time, perform two printing actuation printed in expansion ink to the 2nd time, or On the contrary, after printing in expansion ink to one printing actuation or the 1st time, By performing two printing actuation usually printed in ink to the 2nd time, or operating the manual operation button 37 of the host computer section 17, or the manual operation button 38 of the printer section 17 further The color of any one piece of the image for expansion ink (the 2nd image 16) or the usual images (the 1st image 15) can be selected, and it can print in expansion ink.

[0021]

[Effect of the Invention] Thus, it sets to the creation approach of the solid image by the ink jet printer of this invention. The host computer section possessing the application for image creation, and the printer driver which creates printing data, It has the printer section possessing the print head driven by the driving pulse from the drive circuit to which the data stored in the memory area which the data from the printer drive are inputted and is stored, and its memory area are read and supplied, and its drive circuit. Usually, a selection means (manual operation button) to choose ink printing and expansion ink printing is formed in said printer driver or the printer section. Printing one side of the data of the image of two kinds of different A and B created with said application to a printing hand-ed by the usual ink print head which carries out the regurgitation of the usual ink in a print head Print another side of the data of said image to a printing hand-ed by one printing actuation by the expansion ink print head which carries out the regurgitation of the expansion ink, or Or expansion ink printing can usually be performed using the data of one certain color in the image of printing by dividing ink printing and expansion ink printing into two printing actuation by exchange of a print head, and usually performing them, or operating said selection means. So, it can use for the image expression of a road sign, an

advertising advertisement object, etc., and very suitable feeling can be given.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view of the screen for explaining the solid screen created by the creation approach of the solid image by the ink jet printer of this invention.
[Drawing 2] It is the sectional view of the screen for explaining the solid screen created by the creation approach of the solid image by the ink jet printer of this invention.
[Drawing 3] It is the perspective view of the print head used for the creation approach of the solid image by the ink jet printer of this invention.
[Drawing 4] It is the block circuit diagram of the equipment used for the creation approach of the solid image by the ink jet printer of this invention.
[Description of Notations]
1 Form
2 and 2' usual ink 2, 2'
3 3' Expansion ink
4 Print Head
4a The head for yellow
4b The head for Magentas
4c The head for cyanogen
4d Head for expansion
5 Carriage
6 Print Sheet
7 Guide Shaft
8 Belt
9 Motor
10 Pulley
11 Timing Slit
12 Host Computer Section
13 Application for Image Creation
14 Printer Driver
15 1st Image
16 2nd Image
17 Printer Section
18 Data Decomposition Processing Section
19 Memory Area for Yellow
20 Magenta Field
21 Cyanogen Field
22 Memory Area for Expansion
23 24 Interface
25 Data Analysis Section
26 Memory Area for Yellow
27 Memory Area for Magentas
28 Memory Area for Cyanogen

29 Memory Area for Expansion
30 Drive Circuit for Yellow
31 Drive Circuit for Magentas
32 Drive Circuit for Cyanogen
33 Drive Circuit for Expansion
34 Carriage Control Circuit
35 Vertical-Format-Unit Circuit
36 Paper Feed Motor
37 38 Manual operation button
S1 and S2 Change-over switch
t, t' Connection terminal
[Selection Fig.] drawing 4

[Translation done.]